

Section 3 Contents

3.1	Background	3-1
3.2	Planning Guidelines	3-1
3.3	Basin Description	3-2

Tables

3-1	Mean Temperatures	3-6
3-2	Precipitation and Evapotranspiration	3-7
3-3	Climatic Zones	3-12
3-4	Vegetative Types	3-13
3-5	Land Areas	3-14
3-6	Land Ownership and Administration	3-14
3-7	Federal Land Administration	3-15

Figures

3-1	Location Map	3-3
3-2	Climatological Reporting Stations	3-8
3-3	Annual Precipitation	3-9
3-4	General Geology	3-10
3-5	Soil Survey Areas	3-11

Section 3

State Water Plan - Cedar/Beaver Basin

Introduction

3.1 Background

The people of Utah have always planned for the protection and use of the water resources through cooperative efforts. State directed water planning was formalized by specific legislation in 1963. This plan for the Cedar/Beaver Basin is another step in that process.

3.2 Planning Guidelines

The *State Water Plan* describes the basic premises and lays the foundation for all state water planning. This insures continuity so individual basin plans will be consistent with the statewide plan and with each other.

3.2.1 Principles

There are many values, uses and interests involved in preparing a basin plan. There are also certain guiding principles to be considered. These are listed below.

- All waters, whether surface or subsurface, are held in trust by the state as public property and their use is subject to rights administered by the state engineer. The doctrine of prior appropriation has governed Utah water law since statehood.

- Water is essential to life. It is our responsibility to leave good quality water to meet the needs of the generations to follow.

- The diverse present and future interests of Utah's residents should be

protected through a balance of economic, social, aesthetic and ecological values.

- Water uses that are difficult to identify beneficiaries for, such as recreation and aesthetics, should be included in program evaluation.

- Public input is vital to water resources planning.

- All residents of the state are encouraged to exercise water conservation and implement wise use practices.

- Water rights owners are entitled to transfer their rights under free market conditions. The state engineer should be informed of any ownership transfers in order to keep records current and avoid interference with other rights.

■ The *State Water Plan*²¹ describes a process for planning, conserving and developing the water resources. It covers all aspects of Utah's water resources and has the flexibility to be changed as future conditions require.



Relics in Cedar City

- Water resources projects should be technically, economically and environmentally sound.
 - Water planning and management activities of local, state and federal agencies should be coordinated.
 - Local governments, with state assistance as appropriate, are responsible for protecting against emergency events such as floods and droughts.
 - Designated water uses and quality should be improved or maintained unless there is evidence the loss is outweighed by other benefits.
 - Educating Utahns about water is essential.
- Effective planning and management requires a broad-based citizen understanding of water's physical characteristics, potential uses and scarcity values.

3.2.2 Purpose

One main purpose of this basin plan is to identify issues and describe future alternatives and possible development to provide for the water needs of future generations. Irreversible commitments could be very costly and prevent the fulfillment of future needs. Coordinated planning between all state and federal agencies and local entities can be the vehicle to involve concerned parties.

3.2.3 Organization

State water planning is the responsibility of the Division of Water Resources under the auspices of the Board of Water Resources. Several other state agencies with major water-related missions are involved in the water planning process.

With this in mind, a state water plan coordinating committee representing 12 state agencies facilitated preparation of the *Cedar/Beaver Basin Plan*. There is a steering committee consisting of the chair and vice chair of the Board of Water Resources, executive director of the Department of Natural Resources, and director and assistant director of the Division of Water Resources. This committee provided policy guidance, resolved issues and approved this plan prior to acceptance by the Board of Water Resources.

In addition, 19 federal and other state agencies participated as cooperating entities. These agencies have particular expertise in various fields to assist with plan development. Also, a statewide local advisory group representing 17 organizations and special interest groups have assisted with input and plan review. This group represents a spectrum of various interests and geographical locations. The original memberships of these committees and groups are listed in Section 3.4, Introduction, of the *State Water Plan*.²¹

Also, the local Basin Planning Advisory Group for the Cedar/Beaver Basin provided input by way of advice, review and decision making. Most of the members of this group reside within or are directly involved in basin affairs. They represent various local interests and provide geographical representation within the basin.

3.2.4 Process

During the review and approval process, four drafts of the *Cedar/Beaver Basin Plan* were prepared. These were: (1) In-House Review Draft, (2) Committee Review Draft, (3) Advisory Review Draft, and (4) Public Review Draft. Revised drafts occurred where warranted. After this process, the final basin plan is distributed to the public for their information and use. It is provided to give guidance for water use, conservation, preservation, and development; primarily for local entities but also for state and federal agencies.

3.3 Basin Description

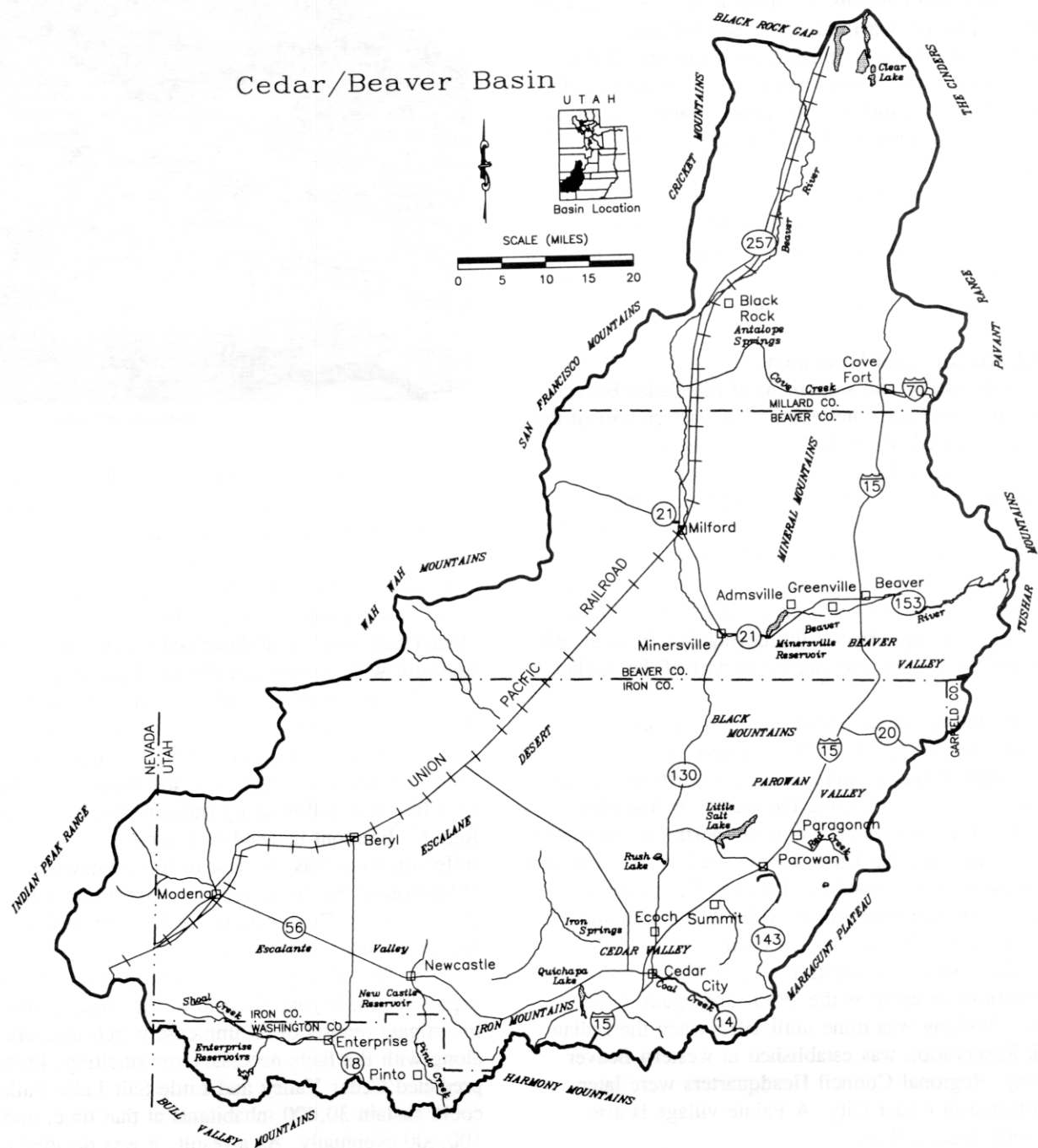
The Cedar/Beaver Basin, located in southwestern Utah, is shown on Figure 3-1. The Cedar/Beaver Basin includes the Beaver River drainage and Parowan and Cedar valleys and the Beryl-Enterprise area. These are all part of the Sevier Lake Basin which is part of the landlocked Great Basin. A small part of the hydrologic boundary of Shoal Creek extends into Nevada.

The Beaver River once terminated in prehistoric Lake Bonneville and in more recent history, before white men arrived, joined the Sevier River and discharged perennially into Sevier Lake, normally a dry playa. At its highest level, Lake Bonneville shores extended into the Escalante Desert. Although not a part of the Beaver River mainstem, Parowan Valley, Cedar Valley and the Escalante Desert would drain into the Beaver River if there were sufficient runoff.

The upper part of the Shoal Creek and Gold Springs Wash drainages within the hydrologic boundary of the Cedar/Beaver Basin are located in Lincoln County, Nevada. The Nevada portion of these drainages has no perennial streams.

The eastern boundary of the Cedar/Beaver Basin is formed by the Tushar Mountains and the Markagunt Plateau. The southern boundary is formed by the Harmony Mountains on the east and the Bull Valley mountains on the west, both foothill extensions of the Pine Valley Mountains. The western boundary consists of a series of mountain ranges. These include the Indian Peak Range, Wah Wah Mountains and Cricket Mountains. The northern boundary crosses to the east

**Figure 3-1
LOCATION MAP**



south of Black Rock Gap and north of Clear Lake, goes down the Cinders to Cove Creek, and along the transition from the Pavant Range to the Tushar Mountains.

The basin contains 3.6 million acres and includes parts of Beaver, Garfield, Iron, Millard and Washington counties. In addition, there are 38,500 acres in Lincoln County, Nevada, not included in this study. This area includes the upper drainage of Shoal Creek, 2,180 acres, and Gold Springs Wash, 36,320 acres.

Elevations range from 12,173 feet at Delano Peak in the Tushar Mountains on the east and 9,660 feet at Frisco Peak in the San Francisco Mountains on the west to 5,600 feet in Cedar Valley, 5,200 feet in Escalante Valley and 4,600 near Clear Lake.

3.3.1 History and Settlement

The history and settlement of the Cedar/Beaver Basin is varied and interesting. The eastern part of the area was settled when the Mormon Church began expanding throughout Utah and into present day southern California. Discovery of precious metals and ore bodies sparked settlement in the western part of the basin and helped bring in the railroad.

Prehistory - Some researchers believe the first inhabitants in the area existed about 10,000 to 12,000 years ago, having crossed the Bering Sea from Siberia long before.⁴¹ They are classed as part of the Archaic culture.

Beginning about 1,000 years ago, a new culture moved into the region. In the northern part of the Cedar/Beaver Basin, there were three different tribes at one time or another calling the area their homeland. The Western Shoshoni were to the north and northwest. To the east were the Utes. To the southwest, south and southeast were the Southern Paiutes. The Southern Paiutes were the predominant tribe in the area and remnants are still found in the basin.

There was consideration of establishing reservations as early as the 1860s and again in the 1880s. Nothing was done until 1915 when the Indian Peak Reservation was established in western Beaver County. Regional Council Headquarters were later established in Cedar City. A Paiute village is also currently located there.

History - The Spaniards came into southern Utah in the late 1540s, but the extent of their travels is not well known.^{3,41,53} In October, 1776, the Dominguez and Escalante party passed through the area in search of a route from Santa Fe, New Mexico, to Monterey, California. Their route entered the basin just west of



Petroglyphs west of Parowan

Clear Lake and went south through the Escalante Desert to near Blue Knoll, about halfway between Milford and Cedar City. After casting lots on whether to go on to California or return to New Mexico, they crossed over to Cedar City and then south to the Virgin River. They gave Coal Creek its first European name, "Señor San Jose", and described Cedar Valley as very beautiful with a great abundance of pasture.

The Old Spanish Trail crossed Fremont Pass from the Sevier River into the Little Salt Lake and Cedar valleys and then westward through Iron Springs to Mountain Meadows and on to the Santa Clara River. This trail was followed by trappers and by Captain John C. Fremont in 1844 on his return from California. Jefferson Hunt was the first of those known as "Mormonee" by the natives to cross through the area. He traveled to California in 1847 to get seed for the settlers in Salt Lake Valley.

In 1849, Parley P. Pratt led a party of 52 men to explore south beyond the rim of the Great Basin and to investigate reports of an immensely rich iron ore body along with the fuels necessary for smelting. Pratt predicted Cedar Valley and Little Salt Lake Valley could sustain 30,000 inhabitants at that time, and 100,000 eventually. As a result, it was decided to settle the area and take advantage of these deposits.

Settlement - Parowan, an Indian word meaning evil water (not bad or stagnant water), was settled in January 1851 by a company of 167 people.¹² They located on Center Creek. Cedar City was established in November 1851 on the Little Muddy, now called Coal

Creek.³⁹ Cedar City was so named because of the abundance of cedar (juniper) trees in the area. The first iron was manufactured here in 1852. The first culinary water system south of Provo was constructed in Cedar City in 1903. After a typhoid fever epidemic, the system was extended beyond diverting water directly from Coal Creek to piping water from springs higher up in the canyon. The next year, Cedar City voted prohibition in an attempt to substitute water for liquor as the main liquid for drinking.

Shortly after in 1852, Enoch was settled. It was originally called Johnson's Springs, later changed to Johnson's Fort. Paragonah, meaning "many springs or marshes", was permanently settled in 1853. At that time, Iron County covered an area from the Sevier River on the east into Arizona and Nevada on the south and west.

In 1856, a group of men left Parowan to settle the area on the Beaver River. This was thought to be a good place to pasture cattle. It was also known there were large quantities of good timber in the canyons. Water was first diverted in the spring of 1856 to irrigate valley lands.

The Post of Beaver was established in 1873. It was named Fort Cameron and maintained until its closure in 1883. In addition, a timber reserve was declared in 1879 covering a large expanse of the area. In 1898, the Beaver Branch of Brigham Young University, later called Murdock Academy, was established at the fort. The many black rock houses built by the soldiers housed students. The school was closed in 1922.

Greenville was established in 1860 by a group of people from Parowan and Cedar City. They had been coming to the area for several years to cut the grass and haul it home for winter feed. Nearby Adamsville was settled in 1862 by several families to take advantage of the pasture lands for farming and raising livestock. The population was bolstered by people escaping from Indian troubles in Sevier, Garfield and Iron counties.

The discovery of the Rollins Mine (Lincoln Mine) in the Mineral Range resulted in the establishment of Minersville northeast of where it now stands. The ore was used to make bullets. Because of the high silver content (19-30 ounces per ton), reports carried to the east said the Mormons used silver bullets.

The Minersville Reservoir and Irrigation Company built a reservoir dam in the early 1890s, but it washed out soon after construction. This dam was rebuilt in 1894. In 1913, the Delta Land and Water Company purchased the interests and built the present Minersville

Reservoir. Prior to construction of Minersville Reservoir, water flowed north of Milford toward Black Rock. After the reservoir was constructed, there was no perennial flow in the Beaver River beyond Milford, causing an area near the Beaver-Millard County line to turn from a marsh/swamp area to one of sand dunes and blowing dust, threatening the highway and the railroad.

A mill was established near present day Milford to process ore from the Mineral Range. Two fords across the Beaver River were used. The ore freighters used one of these two "mill fords" and hence the name Milford. The first family established themselves in 1880. With the coming of the railroad, Milford became a shipping terminal for all of southern Utah.

A southern extension of the railroad, begun from Salt Lake City in 1871, was extended to Clear Lake in 1880.⁴¹ This was a part of the extension of the Utah Central Railway which became the Utah Southern Railroad. The Utah Southern Extension was completed to Frisco during the summer of 1880. These were later all combined under one name, the Utah Central Railway, which ran from Ogden to Frisco. By 1899, the railroad had been extended to Uvada on the Utah-Nevada border. Eventually, it all became a part of the Union Pacific Railroad Company with service from Salt Lake City to Los Angeles.

The original settlers on Shoal Creek located in Hebron. In May 1882, Orson W. Huntsman cleared 320 acres where Enterprise now stands. Five families located there in 1896, officially establishing Enterprise.

New Castle was established in 1908. They diverted part of their water from the Santa Clara River drainage, making this the first and still only transbasin diversion in the Cedar/Beaver Basin.

3.3.2 Climate²

Precipitation in the area is influenced by two major storm patterns: one, frontal systems from the Pacific Northwest during winter and spring; the other, late summer and early fall thunderstorms from the south and southwest. The Southern Utah Low, a high altitude low pressure system often covering parts of several states, causes wide-spread precipitation between the winter frontal systems and summer thunderstorms.

There are 11 climatological stations within the basin where daily temperatures and precipitation are measured and 17 snow courses in and near the basin where the winter snowpack is measured. Telemetry systems have been installed on 11 of these to make data available on a continuing basis. The 1961-1990 base

period is used in this report. The climatological and snow course stations are shown on Figure 3-2.

Temperature - Temperatures fluctuate nearly every year from a maximum of about 100° F. to a minimum of below zero with daily variations as much as 40° F. The mean annual temperature in the valleys varies from 48°F in the Beaver and Enterprise-Beryl Junction area to 51°F at the Cedar City Airport. The average frost-free periods range from 135 days at Cedar City to 98 days in the Escalante Valley. Temperature data is given in Table 3-1 for some of the key valley stations.

Precipitation - The precipitation ranges from over 40 inches in the Tushar Mountains and Markagunt Plateau to about eight inches in the desert areas of the northwest part of the basin. Climate in the valley areas is arid to semi-arid with an average precipitation of about 11 inches. Precipitation can be highly variable, some wet years receiving three times that in the drier years. The annual precipitation is shown on Figure 3-3. The annual precipitation and reference evapotranspiration at five valley stations are shown in Table 3-2. The reference evapotranspiration is calculated from the Hargreaves equation for alfalfa. Snow course records show accumulated water content collected during the winter months.^{66,77} Most stations can be accessed to determine monthly, daily, or even single storm accumulations. The April 1st forecast is

the water supply indicator for the coming season. This is based on the snow course soil moisture levels, snow pack water content and other factors. Snow course locations are shown on Figure 3-2.

Annual water surface evaporation varies from about 41 inches at Beaver to 44 inches at Milford and Black Rock. Possible sunshine varies from 82 percent during September to 47 percent during December. Prevailing winds are from the southwest at 7 to 12 miles per hour. Maximum wind movement generally occurs during May. The velocity increases to the west in the open desert areas.

3.3.3 Physiography and Geology

Physiography - The Cedar/Beaver Basin as discussed in this report is located entirely within Utah. The only exception is the upper drainage areas of Shoal Creek and Gold Springs Wash which extend into Lincoln County, Nevada. These areas are briefly described in Section 5. The basin area is varied, distinguished by plateaus, escarpments, rugged peaks, and mountain ranges and basins. They are all a reflection of the geology.

The topography is such that there is only surface water outflow from the basin during very wet periods of precipitation. This outflow would be in the Beaver River, through Black Rock Gap and downstream until it joins the Sevier River.

**Table 3-1
MEAN TEMPERATURES**

Station	Monthly				Mean Annual (F°)	Frost-free Days
	January Max. (F°)	January Min. (F°)	July Max. (F°)	July Min. (F°)		
Beaver	42	14	88	51	48	104
Cedar City Airport	42	17	90	58	51	135
Enterprise-Beryl Junction	41	11	90	51	48	98
Milford	39	13	92	55	49	120
Parowan	42	14	87	55	49	129

Note: All temperatures are 1961-90 normal values.

Frost-free days are from average last spring to first fall freezes (32 F°).

Source: Utah Climate.

Table 3-2
PRECIPITATION AND EVAPOTRANSPIRATION

Station	Annual Precipitation	Seasonal Evapotranspiration
	(inches)	
Beaver	11.7	28.4
Cedar City Airport	11.5	34.4
Enterprise-Beryl Junction	10.2	34.8
Milford	9.4	34.1
Parowan	13.1	35.0

Note: All precipitation values are 1961-90 normals.

Source: Utah Climate

In effect, the Cedar/Beaver Basin is made up of six groundwater reservoirs. These are the upper Beaver River, Milford area, lower Beaver River, Parowan Valley, Cedar Valley and the Beryl-Enterprise area. The lower Beaver River groundwater basin, which includes the area below Black Rock and Sulphurdale, is not discussed in detail as there are no data available.

The east boundary of the basin is formed by the Markagunt Plateau and the Tushar Mountains. From this high rim on the western boundary of the basin and Range-Colorado Plateau transition, there is a sharp drop to the valley floor, exposing some spectacular scenic views. Cedar Breaks National Monument is a colorful amphitheater eroded into the Claron (Wasatch) formation. To the north are the lofty, snow-capped Tushar Mountains. This is the highest point in the basin. From this high vantage point, one can look westerly over a broad panorama of distant ranks of mountain ranges, characteristic of the Basin and Range Province.

In direct contrast to the cool, forested topography on the east, the western desert areas swelter in the intense desert heat, dissipating any water they receive into the atmosphere. This topography produces an environment from conifer-aspen forests and cool mountain streams to scantily vegetated, dry desert lands.

General Geology - The Cedar/Beaver Basin lies at the eastern edge of the Basin and Range Province, characterized by small fault-block mountains interspersed among alluvial basins. Most of the Cedar/Beaver Basin is relatively low in elevation and

arid. However, its eastern rim rises to 12,000 feet in the Tushar Mountain, and 11,000 feet in the Markagunt Plateau. The perennial streams draining westward from these high elevations provide most of the surface water in the basin, and most of the recharge to the groundwater basins.

The bedrock uplifts are composed of a variety of rock types. Hard and dense metamorphic, volcanic, and sedimentary rocks of all ages may or may not yield water to wells or springs depending upon their fracture permeability. Softer volcanic and sedimentary deposits of primarily Mesozoic and Tertiary age (M and Tv in Figure 3-4) generally have low permeability, but there are some exceptions. The rock formations in the Cedar/Beaver Basin have received little exploration, and as a rule "water is where you find it."

The alluvial basins (Qa and Ql in Figure 3-4) contain as much as 5,000 feet of unconsolidated gravel, sand, silt, clay, and interbedded lava flows. It is these alluvial basins which provide the primary groundwater reservoirs in the Cedar/Beaver Basin.

3.3.4 Soils, Vegetation and Land Use

Resource data on the soils and vegetation varies in detail, particularly across land ownership and administration boundaries. Land use data vary depending on the purpose for collecting the data and on the methodology used.

Soils - Interagency coordination has made these soil surveys exceptionally useful. See Figure 3-5 for survey orders and areas. Soil Survey information is

SOURCE: UTAH CLIMATE AND

**Figure 3-3
ANNUAL PRECIPITATION
Cedar/Beaver Basin**

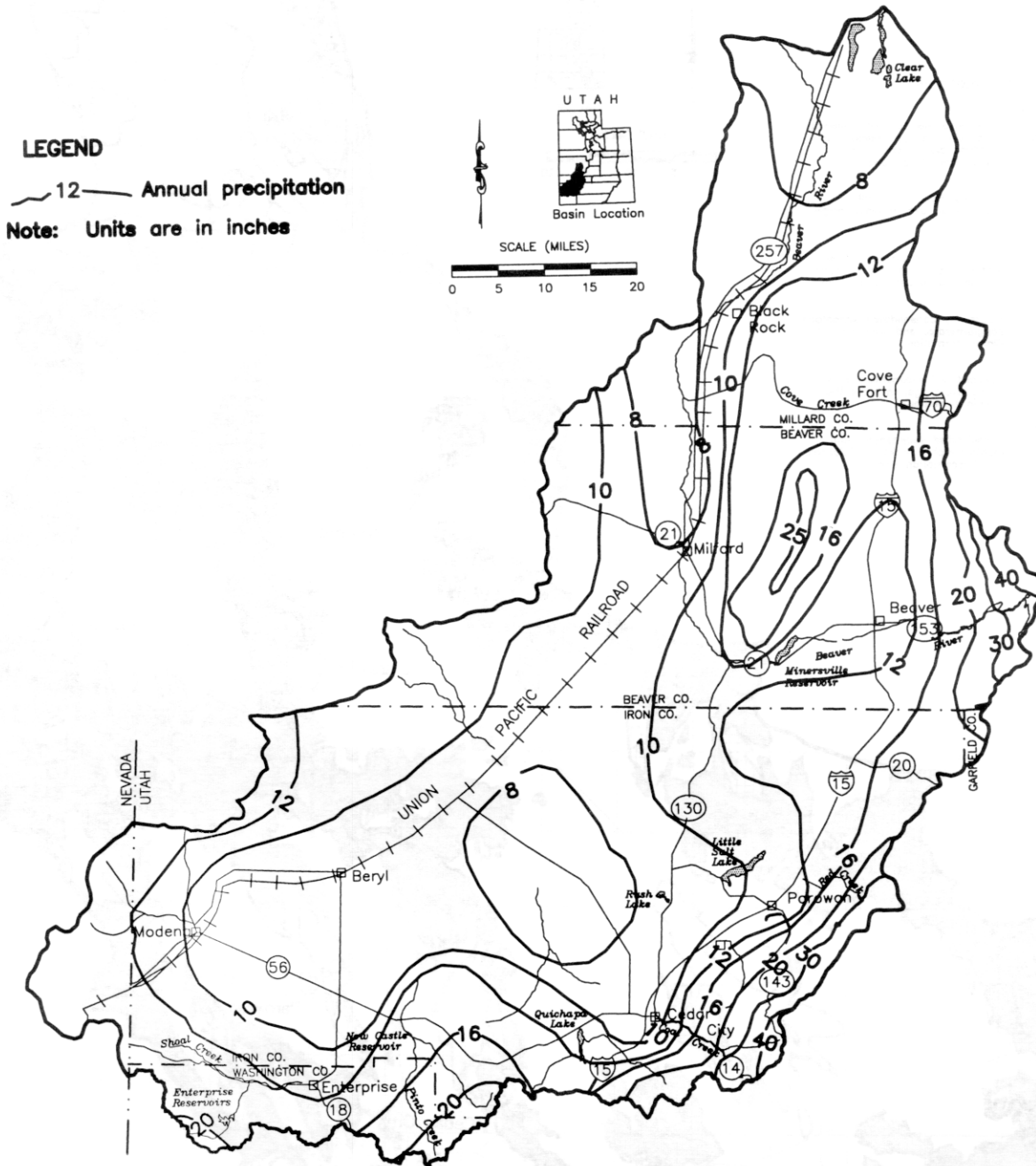


Figure 3-4
GENERAL GEOLOGY
Cedar/Beaver Basin

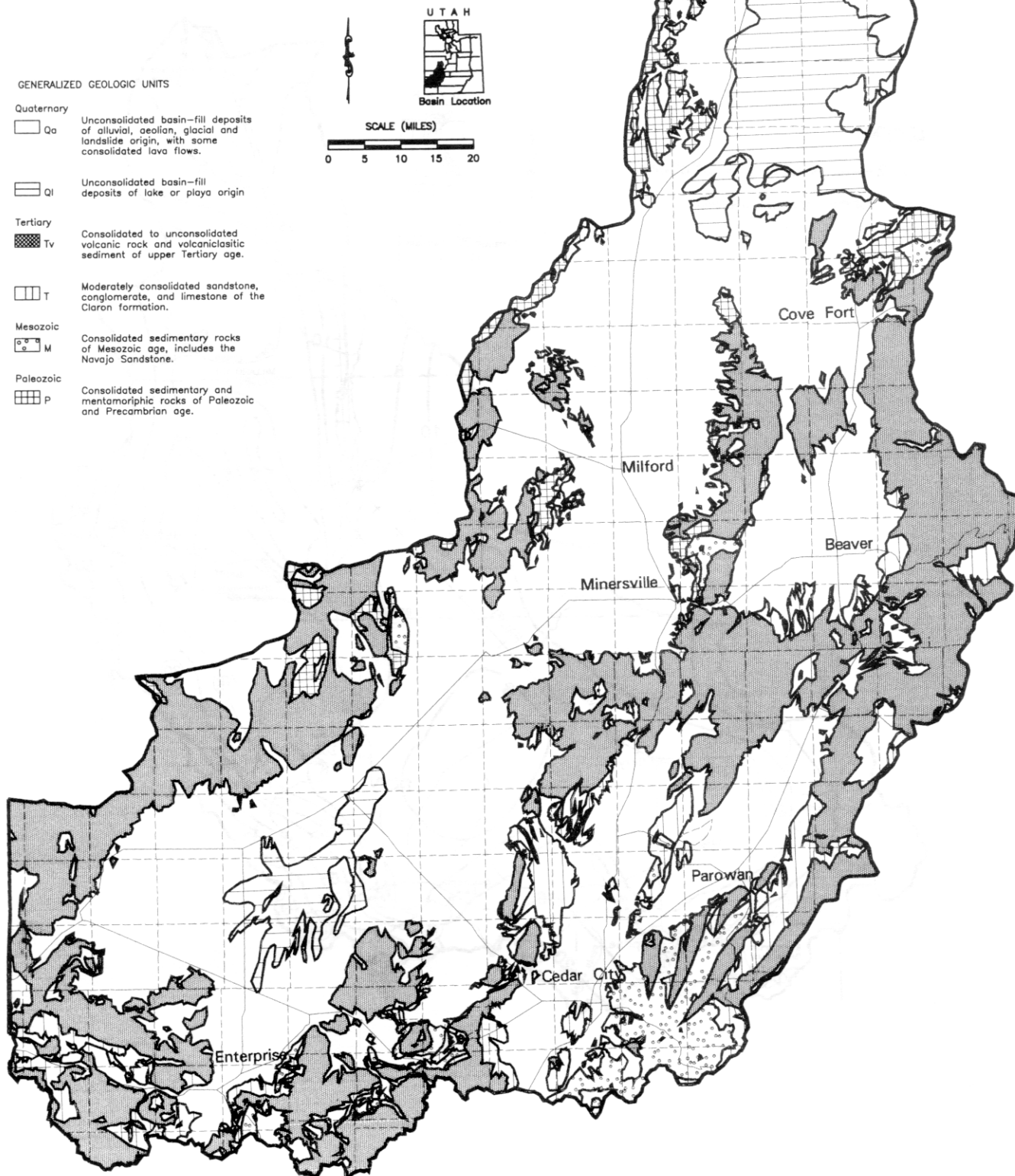
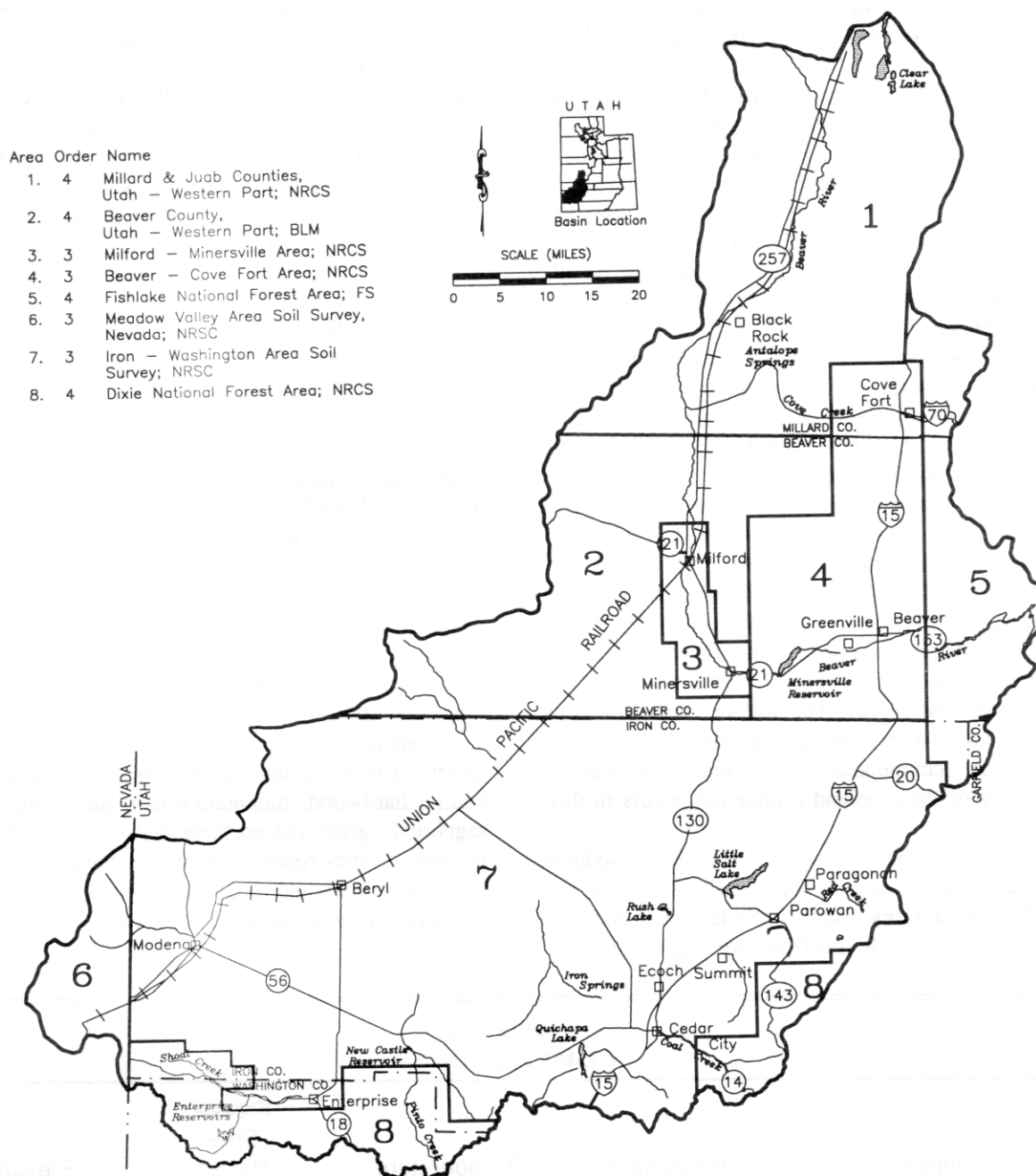


Figure 3-5
SOIL SURVEY AREAS
Cedar/Beaver Basin



SOURCE: NATURAL RESOURCES CONSERVATION SERVICE

found in reports available from the Natural Resources Conservation Service, Forest Service and Bureau of Land Management. Soil surveys were conducted at different levels of detail to accommodate the land uses. In general, the information was collected at three levels: 2nd, 3rd and 4th order mapping described as follows.

The 2nd order surveys are made for intensive land uses requiring detailed information for making predictions of suitability for use and treatment needs. This type survey is conducted on all cropland areas.

The 3rd order surveys are made for land uses not requiring precise knowledge of small areas or detailed soil information. This type survey is conducted on all national forest lands and the majority of private and public rangelands.

The 4th order surveys are made for extensive land uses requiring general soil information for broad statements concerning land use potential and general land management. This type survey was conducted in western Beaver and Millard counties.

There are four climatic zones in the Cedar/Beaver Basin. The zones are summarized in Table 3-3. Generalized soils descriptions follow.

SEMIDESERT CLIMATIC ZONE soils generally have very little development and are usually found in alluvial deposits and lake sediments. These soils include the ochric and calcic horizon, a pH of more than 8.0 and very deep soil depths. The surface ochric horizons are light in color with little development. Calcic horizons show accumulations of calcium carbonates. The majority of the cropland production occurs in this zone.

UPLAND CLIMATIC ZONE soils have moderate development and are usually found on alluvial fans and hills. The soil features usually include mollic and argillic horizons. Mollic horizons are organically

enriched surface layers showing dark colors. Usually this horizon is minimally expressed. The argillic horizon is expressed by textural clay accumulation in the subsoil, which helps contain water in the upper subsoil. These soils have a pH from about 7.5 to 8.0 due to the higher precipitation which leaches the calcium carbonate. The majority of this zone is used for rangeland with only a small amount of cropland.

MOUNTAIN CLIMATIC ZONE soils have high development and are usually found on mountain slopes. The soil features include mollic and argillic horizons. Mollic horizons are organically enriched surface layers displaying dark colors. The argillic horizon is expressed by textural clay accumulation in the subsoil, which helps contain water in the upper subsoil. These soils have a pH of about 7.0 to 8.0 due to the higher precipitation. The majority of this zone is used for rangeland with some timber production.

HIGH MOUNTAIN CLIMATIC ZONE soils have high development and are usually found on mountain slopes and in mountain valleys. The soil features include thick mollic and argillic horizons. Mollic horizons are organically enriched surface layers, well expressed with dark colors. The argillic horizon is expressed by textural clay accumulation in the subsoil which helps contain water in the upper subsoil. These soils have a pH of about 6.0 to 7.5 due to the higher precipitation. The majority of this zone is used for rangeland and timber production.

Vegetation - There are six vegetative types identified in the Cedar/Beaver Basin. These are conifer-hardwood, mountain brush, pinion-juniper, sagebrush, grass and northern desert shrub. These vegetative types roughly follow the higher elevations to the valley floors and areas with annual precipitation of 35 inches to lower areas of 8 inches.

**Table 3-3
CLIMATIC ZONES**

Climatic Zone	Precipitation (inches)	Temperature (° F)	Freeze Free Period (days)	Elevation (feet)
High Mountain	22-40	34-45	40-90	8,000-10,000
Mountain	16-22	42-50	70-170	6,000-8,200
Upland	12-16	45-59	120-170	4,500-6,900
Semidesert	8-12	52-59	120-190	4,500-6,300

The conifer-hardwood forest type lies above the 8,000-foot elevation. It consists mostly of white fir, Douglas fir, spruce and quaking aspen. The mountain brush type lies predominantly between 7,500 and 8,500 feet elevation. It consists mainly of gambel oak, serviceberry and curleaf mountain mahogany. The pinion-juniper forest type is predominantly pinion, Utah juniper and singleleaf pinion. It occurs between 5,800 and 7,500 feet elevation. The sagebrush type ranges from the semidesert valley floors of 5,000 feet to mountain valleys and mountain slopes at about 8,000 feet. Soils dictate this vegetative type more than the elevation. The predominant vegetative community is big sagebrush, black sagebrush, low sagebrush, wheatgrasses, tall native bluegrasses and Indian ricegrass. The grass vegetative type is found in the semidesert zone at about 5,000 feet. This type occurs on sandy loams and sands. Important plants include Indian ricegrass, needleandthread, bottlebrush, squirreltail, galleta, along with winterfat. The northern desert shrubs include mainly black greasewood and shadscale. These plants occur in the bottomlands of the basin on soils affected by salts.

Cropland and barren areas are not included. The barren lands include desert playas, recent extrusions of volcanic basalt and areas covered predominantly with

annual weeds. On the higher flanks of the Tushar Mountains, an area of rock was also included as barren. Table 3-4 shows the vegetative types and areas.

Land Use - The Natural Resources Conservation Service capability groupings show, in a general way, the suitability of the soil for most field crops. Soils are grouped according to their limitations and the way they respond to treatment.

Capability classes, the broadest group, run from one to eight. The numbers indicate progressively greater limitations and narrower choices for practical uses of agricultural cultivation. Other uses, such as for grazing or wildlife, may not be as restrictive. The lower numbers are the more choice lands suitable for growing irrigated crops. As the numbers increase, the land becomes more suitable for permanent pasture and progressively to grasslands, forested areas and rocklands. Most of the cropland is found in the first four classes.

Lands used for farming can also be defined according to their agricultural production ability and potential. There are two categories describing the better croplands: prime farmlands and farmland of statewide importance. Only about 3 percent of the basin area is used for irrigated agriculture while about 3 million acres are used primarily for grazing.

**Table 3-4
VEGETATIVE TYPES**

Vegetative Type	Beaver/ Milford	Cedar/ Parowan (Acres)	Escalante Desert	Total
Conifer-hardwood	77,400	62,100	2,200	141,700
Mountain-brush	92,500	68,800	47,100	208,400
Pinion-juniper	272,600	195,600	502,600	970,800
Sagebrush	443,600	190,600	438,800	1,073,000
Northern desert shrub	453,300	92,800	356,300	902,400
Grassland	57,200	31,100	61,600	149,900
Subtotal	1,396,600	641,000	1,408,600	3,446,200
Other land	57,100	53,900	48,300	159,300
Total	1,453,700	694,900	1,456,900	3,605,500

Note: Some other miscellaneous areas are not listed.

**Table 3-5
LAND AREAS**

SUB-BASIN	COUNTY					Total
	Beaver	Garfield	Iron (Acres)	Millard	Washington	
Beaver	502,240	-0-	12,840	684,270	-0-	1,199,350
Milford	292,990	-0-	42,320	-0-	-0-	335,310
Parowan	10,580	7,220	315,480	-0-	-0-	333,280
Cedar	-0-	-0-	330,440	-0-	-0-	330,440
Escalante	168,590	-0-	1,096,750	-0-	153,050	1,418,390
Total	974,400	7,220	1,797,830	684,270	153,050	3,616,770

Forest resources found in many areas provide opportunities for commodity production in addition to the utilization of the grazing resource. There are six different forest types: fir/spruce, pine, aspen, gambel oak, mountain mahogany and pinion-juniper. The only intensive management of commercial timber stands are the fir/spruce, pine and aspen in the Beaver River drainage on the Tushar Mountains and in the Parowan Creek and Coal Creek drainages. It is not emphasized in other parts of the basin where there are some commercial stands of ponderosa pine and aspen along with minor amounts of fir and spruce. There is a commercial logging and processing operation located in Beaver. The logs harvested in a commercial operation near Cedar City are shipped to Panguitch for processing.

Pinion-juniper stands are the major forest type. Christmas trees are an important product, primarily in the Beaver area. There is some commercial harvesting of fire wood, fence posts and pinenuts. There has been

some interest in harvesting sap from pinion and using juniper for fire starter, perfume and deodorizing bases.

3.3.5 Land Status

The total area of the Cedar/Beaver Basin is about 3.6 million acres. The areas by sub-basin are shown in Table 3-5. The federal government has the responsibility to administer about 66 percent of the lands in the basin. The state administers about 8 percent and 26 percent is privately owned lands. The Forest Service lands include 7,150 acres in the Ashdown Gorge Wilderness Area. There are also 3,670 acres of Indian lands included in the federal lands covering 0.1 percent of the basin. The breakdown of land ownership and administration is shown in Table 3-6.

The federally administered land is under the jurisdiction of three agencies; the Forest Service, Bureau of Land Management and the National Park Service. Table 3-7 shows the areas under each of these jurisdictions. ■ ■

**Table 3-6
LAND OWNERSHIP AND ADMINISTRATION**

STATUS	COUNTY					Total
	Beaver	Garfield	Iron (Acres)	Millard	Washington	
Private	180,330	2,060	668,770	78,250	21,160	950,570
State	84,150	-0-	126,820	70,170	1,690	282,830
Federal	709,920	5,160	1,002,240 ^a	535,850	130,200	2,383,370
Total	974,400	7,220	1,797,830	684,270	153,050	3,616,770

^a Includes 7,150 acres of wilderness area.

**Table 3-7
FEDERAL LAND ADMINISTRATION**

AGENCY	COUNTY					Total
	Beaver	Garfield	Iron (Acres)	Millard	Washington	
Forest Service	136,600	580	135,150 ^a	34,390	125,330	432,050
Bureau of Land Management	573,320	4,580	859,110	500,290	4,870	1,942,170
National Park Service	-0-	-0-	5,480	-0-	-0-	5,480
Indian Reservation	-0-	-0-	2,500	1,170	-0-	3,670
Total	709,920	5,160	1,002,240	535,850	130,200	2,383,370

^a Includes 7,150 acres of Ashdown Gorge Wilderness Area